

MRI scanning in 120 patients at the five-year follow-up, and the MRI evaluation showed improvement in defect-filling for both treatments; however, neither group was found to be superior at this stage. There is now growing evidence typified by trials like this that cartilage grafting is better than microfracture for large articular cartilage defects in the knee, particularly those that are > 3 cm.

Return to pivoting sport after anterior cruciate ligament reconstruction

■ One of the primary reasons to undergo anterior cruciate ligament (ACL) reconstruction is to allow a return to pivoting sports. Whilst research has, for the most part, focused on short-term outcomes, there are few studies looking at the longer-term outcomes of ACL injury. Here at 360, we were interested to see this report from **Oslo**

(**Norway**) looking at the outcomes of ACL reconstructions in the longer term.⁶ The 258 patients included in this study were all involved in pivoting sports, and had undergone ACL reconstruction at least 15 years previously. Data were collected through interviews, patient-reported outcome measures, and radiographs. The authors defined the development of osteoarthritis as Kellgren and Lawrence grade ≥ 2 plus almost daily knee pain in the last month. Of the 210 patients at 15 years of follow-up, 109 (52%) reported that they had returned to pivoting sport. Return to play was associated with less symptomatic OA (odds ratio (OR) 0.28) as well as a lower chance of radiographic OA (OR 0.40), adjusted for age, sex, combined injury, self-reported knee function, and time between injury and surgery. Those who returned to pivoting sport had better function in activities of daily living (ADL). Whilst

there is no attempt to establish causation here (and it would be impossible to do so given the design of the paper), the authors make a number of interesting observations. There are, to our knowledge, very few other long-term follow-ups post-ACL reconstruction. The finding that around 50% of patients return to play in the long term following ACL reconstruction makes the procedure potentially of benefit. What is, of course, not clear is whether it is the return to play that sees off the arthritis, or, perhaps more likely, that those who go on to develop arthritis do not return to play.

REFERENCES

1. **Conaghan PG, Hunter DJ, Cohen SB, et al.** Effects of a single intra-articular injection of a microsphere formulation of triamcinolone acetonide on knee osteoarthritis pain: a double-blind, randomized, placebo-controlled, multinational study. *J Bone Joint Surg [Am]* 2018;100-A:666-677.

2. **Abdel MP, Ollivier M, Parratte S, et al.** Effect of postoperative mechanical axis alignment on survival and functional outcomes of modern total knee arthroplasties with cement: a concise follow-up at 20 years. *J Bone Joint Surg [Am]* 2018;100-A:472-478.

3. **Chang CB, Jeong JH, Chang MJ, et al.** Concomitant ankle osteoarthritis is related to increased ankle pain and a worse clinical outcome following total knee arthroplasty. *J Bone Joint Surg [Am]* 2018;100-A:735-741.

4. **Anderson LA, Culp BM, Della Valle CJ, et al.** High failure rates of concomitant periprosthetic joint infection and extensor mechanism disruption. *J Arthroplasty* 2018;33:1879-1883.

5. **Brittberg M, Recker D, Ilgenfritz J, Saris DBF.** Matrix-applied characterized autologous cultured chondrocytes versus microfracture: five-year follow-up of a prospective randomized trial. *Am J Sports Med* 2018;46:1343-1351.

6. **Øiestad BE, Holm I, Risberg MA.** Return to pivoting sport after ACL reconstruction: association with osteoarthritis and knee function at the 15-year follow-up. *Br J Sports Med* 2018; bjsports-2017-097718 (Epub ahead of print). PMID: 29550753

Foot & Ankle

X-ref For other Roundups in this issue that cross-reference with **Foot & Ankle** see: **Trauma Roundup 7; Research Roundups 5 & 7.**

End-stage renal failure and Achilles tendon rupture X-ref

■ Patients on renal dialysis start to collect pathology as their disease progresses. These authors from **Baltimore, Maryland (USA)** have set out to establish what the incidence, ramifications, and long-term outcomes are for patients who are dialysis-dependent or have had a kidney transplant.¹ The authors utilized the Medicare data set and included patients treated between 1999 and 2013. The authors classified all 1091 patients with an Achilles tendon rupture and renal failure into patients on the waiting list for a transplant, patients on long-term

dialysis, or post-transplant patients. The authors went on to identify risk factors, and to determine treatment patterns and outcomes in this group of patients. There was a lower incidence of Achilles tendon ruptures in patients who were stable on dialysis as compared with those who had received transplants (relative risk (RR) 0.44); however, those on and off the transplant waiting list were compared with those who were not. In general, patients who sustained an Achilles tendon injury were more likely to be younger, have higher body mass index, and have fewer comorbidities. Overall, 17% of patients received operative treatment within two weeks of diagnosis. The overall 30-day cumulative incidence of postoperative infection was 6.5%. The results of this study suggest that the bad reputation that renal failure/

transplant patients have with Achilles tendons, both in terms of higher incidence and unacceptably high rates of complications, may not be true. It seems that, based on this large series, the best option for patients with an Achilles tendon injury and renal impairment would in fact be to treat them like other patients.

Ankle instability: is rehabilitation the answer?

■ Chronic ankle instability is a tricky condition to treat and can be associated with significant function restriction, particularly when playing sports or walking over rough ground. The mainstays of treatment are surgery or rehabilitation and strengthening exercises. Surgery is usually seen as a last resort in these patients, as the complication burden from the surgery itself is

not insignificant and, in addition, the tightening of the ankle can result in secondary degenerative changes. Although rehabilitation forms the workhorse for treatment of instability in many centres, there are a range of different options, and it is far from clear which patients will benefit from which treatments. A study team from **Thessaloniki (Greece)** have undertaken and published a comprehensive network meta-analysis with the aim of unpicking which of these treatments are successful and which are not.² Their study was designed to answer two different questions: which of the variety of standalone or combined nonsurgical interventions was successful in treating chronic ankle instability as measured by 1) the Cumberland Ankle Instability Tool (CAIT) and 2) treatment-related



18 complications? In what was a comprehensively designed study, the authors conducted random-effects pairwise and network meta-analysis on the data extracted from a comprehensive search comparing various nonoperative treatments for ankle instability. The authors included all studies reporting the outcomes of patients with functional or mechanical ankle instability or recurrent ankle sprains. The authors were able to include 21 trials, which, in total, reported the outcomes of 789 chronically unstable ankles. The trials reported a variety of rehabilitation interventions, including strengthening, balance training, manual therapies, and combinations of these reported as multimodal treatment. The individual trials were assessed using the Cochrane risk of bias tool, which assessed 12 trials as having a low risk of bias. The results, unusually for meta-analysis of rehabilitation interventions, were surprisingly clear. The evidence supports four-week supervised rehabilitation program, including balance training, strengthening, and range-of-motion exercises by, on average, ten points in the CAIT. When considering just standalone interventions, the balance training was the only intervention to be better than the control (mean difference CAIT -5). There has been little doubt for some time that, even in the case of chronic ankle instability, rehabilitation protocols have a role to play as major treatment strategy. This meta-analysis underlines not only how effective these can be, but also

that not all treatment strategies are equal. In the treatment of instability, a multimodal approach is clearly to be preferred.

How common is gastrocnemius tightness?

■ The tight gastrocnemius is a common finding in patients with foot and ankle pathology, and a link has been recognized between the tight gastrocnemius and foot and ankle pathology for many years. However, there is next to no data describing the pathological link and what proportion of patients have a significantly tight gastrocnemius. Researchers from **London (UK)** have reported the results of their study, which aimed to establish the exact link between the two.³ The authors set out to establish the prevalence and degree of gastrocnemius tightness in a control group of 291 patients, with a study group of 97 patients all presenting with foot and ankle pathology. This prospective study evaluated both groups of patients for gastrocnemius tightness, using the lunge test. Gastrocnemius tightness was calculated by measuring the difference in dorsiflexion of the ankle with the knee extended and flexed. There was little clinical difference between the two groups overall, with 6.0° gastrocnemius tightness in controls and 8.0° in those with foot and ankle pathology. However, there were some important differences on subgroup analysis, with patients with forefoot pathology presenting with gastrocnemius tightness of 10.3°, as opposed to 6.9° in those with other pathology. The authors sensibly conclude that, whilst previously thought to be relatively common in patients presenting with foot and ankle pathology, the majority of patients do not have gastrocnemius tightness. However, there are an important subgroup of patients with forefoot pathology that do. It is, of course, unclear from a study like this if the gastrocnemius tightness drives the forefoot pathology, or the other way around.

Charcot arthropathy and surgical treatment

■ One of the many sequelae of diabetes is Charcot arthropathy. Although often presenting concomitantly with diabetic foot ulcers, it is, of course, a completely different pathology. Historically, patients have been treated with accommodative casting during the inflammatory stages and then accommodative orthoses during coalescence. Whilst this is an established treatment, it does have its drawbacks. Secondary ulceration from deformity is relatively common, especially in those patients with hindfoot Charcot, and all patients report relatively poorer quality of life than those with end-stage diabetes and no Charcot arthropathy. There has, for these reasons, been a resurgence in interest in operative correction of these deformities in an attempt to address these two problems. A surgical team from **Maywood, Illinois (USA)** have reported their experience of operative correction of Charcot deformity with aim of resolution of any infection and limb salvage, as well as improving quality of life as measured by the Short Musculoskeletal Functional Assessment (SMFA).⁴ The authors report the outcomes of 25 patients undergoing surgical correction of midfoot Charcot arthropathy. All of their patients were unable to achieve a plantar grade foot, and their results were reported out to a year following treatment. Overall, they were able to achieve improvements in the SFMA scale. On average, patients reported 11.5-point improvement in the functional index and a 12.4-point decrease in the bother index. These authors report a successful operative reconstruction of mid-tarsal Charcot foot arthropathy; in their experience, these patients operated for midfoot arthropathy with an improved quality of life at a year following surgery.

Early reports of a new fixed-bearing ankle arthroplasty

■ The Infinity Ankle Replacement is a new fixed-bearing total

ankle arthroplasty. Like many new implants, there is little literature published surrounding its use. In a retrospective review of 64 consecutive patients, a study team in **New York, New York (USA)** report the complications, reoperations, radiographic, and clinical outcomes of the Infinity.⁵ The series had an average follow-up of just over two years and the authors undertook a review of medical records and radiographs. The authors established preoperative and postoperative radiographs for alignment, component position, and evidence of loosening or subsidence. Clinical outcomes were reported as part of a patient-reported outcomes measure, the Foot and Ankle Outcome Score (FAOS). The overall survival of the implants at two years was a not-so-impressive 95.3%. In common with many series, the authors also reported a relatively high rate of complications, with 14 ankles (21.8%) suffering a total of 17 complications, requiring 12 reoperations. Subsidence of the talar implant was the cause of all revision surgery, which was required in three ankles. The tibiotalar coronal deformity was significantly improved after surgery and maintained during the follow-up period. There was a high rate of early radiographic signs visible around the tibial component; by the two-year follow-up, 20 ankles (31%) had radiolucencies visible. The picture was not all bleak, however, and clinical outcome scores were significantly improved on the FAOS score. There was a significant improvement in all components, including 39.0 to 83.3 for pain, 34.0 to 65.2 for symptoms, 52.3 to 87.5 for activities of daily living, and 15.7 to 64.2 for quality of life. The authors reach the reasonable conclusion that the majority of complications were minor. However, there was a common theme of failures and radiographic abnormalities related to the tibial implant, which definitely warrants careful longer-term follow-up series to establish if the early radiolucent lines turn into loose components.

Interference screw fixation versus Pulvertaft weave for tibialis posterior transfer

■ The tibialis posterior (TP) transfer is a common treatment for foot drop. By transferring the tendon, the surgeon addresses the foot drop in a dynamic way. There is little in the way of surgical options that fare better or are more widely respected. This study group from **London (UK)** noted, however, that the standard practice is currently immobilization of the ankle in a non-weight-bearing cast for six weeks.⁶ A potentially better regime would be early active dorsiflexion with protected weight-bearing. This would offer the potential to reduce stiffness and medical complications

associated with lower-limb immobilization. The authors of this study set up a cadaveric model to establish if tendon displacement under cyclic loading differed with the Pulvertaft weave (PW) and interference screw fixation (ISF) in a cadaveric foot model. In one of the more extensive cadaveric studies we have seen here at 360, the authors undertook 24 TP tendon transfers in cadaveric feet, half with each technique (PW vs ISF into the cuboid). The cadaveric feet were then cycled 1000 times with a load range of 50 N to 150 N and then loaded to failure. Outcomes assessed were strain to failure and tendon displacements. Tendon displacement was similar in both groups; however,

one specimen in the ISF group suffered early screw failure. For tendon transfer, ISF and PW techniques were comparable, with no differences in tendon displacement after cyclical loading or load to failure. However, the authors reported that there was greater variability observed in the PW group, which suggests it may be a less reliable technique.

REFERENCES

1. Humbyrd CJ, Bae S, Kucirka LM, Segev DL. Incidence, risk factors, and treatment of achilles tendon rupture in patients with end-stage renal disease. *Foot Ankle Int* 2018;39:821-828.
2. Tsikopoulos K, Mavridis D, Georgiannos D, Vasiliadis HS. Does multimodal rehabilitation for ankle instability improve patients' self-assessed

functional outcomes? A network meta-analysis. *Clin Orthop Relat Res* 2018;476:1295-1310.

3. Malhotra K, Chan O, Cullen S, et al. Prevalence of isolated gastrocnemius tightness in patients with foot and ankle pathology. *Bone Joint J* 2018;100-B:945-952.
4. Kroin E, Chaharbakhshi EO, Schiff A, Pinzur MS. Improvement in quality of life following operative correction of midtarsal Charcot foot deformity. *Foot Ankle Int* 2018;39:808-811.
5. Saito GH, Sanders AE, de Cesar Netto C, et al. Short-term complications, reoperations, and radiographic outcomes of a new fixed-bearing total ankle arthroplasty. *Foot Ankle Int* 2018;39:787-794.
6. Marsland D, Stephen JM, Calder T, Amis AA, Calder JDF. Strength of interference screw fixation to cuboid vs Pulvertaft weave to peroneus brevis for tibialis posterior tendon transfer for foot drop. *Foot Ankle Int* 2018;39:858-864.

Wrist & Hand

X-ref For other Roundups in this issue that cross-reference with *Wrist & Hand* see: *Research Roundup 7*.

How should we treat scapholunate ligament ruptures?

■ The scapholunate interosseous ligament is somewhat of an enigma. After an injury when someone falls heavily on the outstretched hand, a mild 'sprain' may settle but a significant rupture can cause disabling loss of function and altered carpal mechanics, and may ultimately lead to osteoarthritis. During our orthopaedic training, the risk of the latter is drilled into us and the necessity to repair or reconstruct seems obvious. As is often the case, however, the evidence is less convincing than the dogma and we were delighted to come across this systematic review from **Salford (UK)**, which addresses the topic in detail.¹ As the review team points out, there is no really high-quality evidence of the natural history of the condition; the authors were able to identify only a single

satisfactory long-term study and even this paper only reported on the outcomes of lower-grade injuries. This gap in the literature is likely due to the rather obvious observation that higher-grade injuries will usually be operated due to the concern of future degenerative change. Accepting that, based on the limited evidence and expert opinion, surgery may be in the patient's best interests, have we really any idea which technique is best to use? We were rather concerned to read the work of this group, which confirmed that the literature is replete with suggestions from authors who promote their individual hunch as to how to treat the ruptured ligament, typically with the publication of a small series with short-term follow-up, inadequate outcomes, and no control. There is no shortage of papers on the topic; however, of 1191 papers that the authors identified on the topic, only 17 had adequate information suitable for inclusion in this review. Even then, there was no consensus except that surgery generally provides modest pain relief

but long-term stiffness and weakness abound. Across these series, the reported complication rates are high (20%) and there appears to be little correlation between radiological and clinical outcome. In addition to all of this, the evidence would also suggest that patients suffer the risk of a complex regional pain syndrome (CRPS) rate at around 4%. There is some evidence presented that perhaps capsulodesis gives slightly better grip and movement than tenodesis, even though it seems less capable of reducing the scapholunate gap. It is clear that any procedure performed for a scapholunate injury is at best speculative and not entirely satisfactory; the patient should be consented accordingly. In order that we make progress in our understanding in this area, the authors helpfully suggest a minimum data set to allow some form of comparison between future studies due to the heterogenous collection that has occurred thus far. Longer-term follow-up of cohorts is desperately needed to shine a light on this area.

How do we best treat partial tendon lacerations?

■ Flexor tendon lacerations require considerable skill from both the surgeon and the therapist, as well as a motivated and compliant patient, if a good result is to be achieved. Whilst the management of complete flexor tendon injuries is relatively well understood, a particular dilemma for a surgeon is the management of a partial flexor tendon injury, especially when suffered in zone II. Surgical repair inevitably risks stiffness, due to scarring from the manipulation of the tendon and the added bulk of the repair running through the pulleys. There is thus a reasonable argument that the outcome may be better following conservative treatment. However, many surgeons are reluctant to manage these injuries conservatively due to the reported risks of late rupture, as well as triggering and entrapment from scar tissue and lacerated tendon. The current consensus of expert opinion seems to suggest that most surgeons would repair an injury involving over 50%